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INSTALLATION OF NEW EFFLUENT LINE AND ITS INCORPORATION INTO THE SOUTH PLUME REMOVAL ACTION

02/15/91

DOE-735-91
DOE-FMPC/USEPA
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LETTER

Department of Energy
FMPC Site Office
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FEB 15 1991
DOE-735-91

Ms. Catherine A. McCord
Remedial Project Director
U. S. Environmental Protection Agency
Region V - 5HR-12
230 South Dearborn Street
Chicago, IL 60604

Dear Ms. McCord:

INSTALLATION OF A NEW EFFLUENT LINE AND ITS INCORPORATION INTO THE SOUTH PLUME REMOVAL ACTION

Reference: 1) Letter, DOE-593-91, A. P. Avel to C. A. McCord, "Draft Evaluation of Alternatives Document for the Rehabilitation of the Main Outfall Line and Removal Site Evaluation for the Region between Manholes 179 and 180," dated January 15, 1991

2) Letter, DOE-609-91, A. P. Avel to C. A. McCord, "Draft Work Plan Detailing the Rehabilitation of the Main Outfall Line from Manhole 177 to the Great Miami River," dated January 17, 1991

#1008

The FMPC has completed a re-evaluation of the proposal submitted to you on January 15, 1991 for the rehabilitation of the main FMPC outfall line using the Insituform process (Reference 1). This re-evaluation has identified significant technical uncertainties associated with the successful application of the process to the outfall line. As a result of the re-evaluation, DOE recommends that a new effluent pipeline be installed in lieu of rehabilitation of the existing line. This recommendation is based on an assessment of the uncertainties of the Insituform process, a cost comparison of the two alternatives, and consideration of future discharge requirements for the facility.

To facilitate the installation of this new pipeline, DOE proposes to consolidate the proposed action associated with the Rehabilitation of the Main Outfall Line Removal Action into Part 2 of the South Groundwater Contamination Plume Removal Action. This consolidation is proposed due to the similarities in the proposed actions and in the interest of avoiding unnecessary duplication of project documentation.

Preliminary engineering evaluations have identified that the most cost effective and technically sound approach is the installation of a 24-30 inch diameter high density polyethylene line from Manhole 176 to the Great Miami River. This new line would be designed to accommodate projected flows from existing operations, removal and potential remedial activities. Preliminary project schedules developed for the installation of the new pipeline indicate that the action can be completed within the time-frame of the schedules proposed within the Work Plan for Part 2 of the South Groundwater Contamination Plume Removal Action.

To facilitate the incorporation of this work activity into the appropriate documentation, U. S. DOE is recommending extension of the period for responding to the U. S. EPA and the Ohio EPA comments on the Removal Action Work Plan by 20 days and establishing a date for submittal of the revised Work Plan to March 11, 1991.

If you have any questions, please contact me at FTS 774-6159.

Sincerely,

Ray Hansen for

Jack R. Craig
FMPO Remedial Action
Project Director

DP-84:Craig

Enclosure: As stated

cc w/encl.:

R. P. Whitfield, EM-40, FORS
K. A. Hayes, EM-422, GTN
G. E. Mitchell, OEPA-Dayton
L. August, GeoTrans
K. Davidson, OEPA-Columbus
M. Bulter, USEPA-V, 5CS-TUB-3
J. Benetti, USEPA-V, 5AR-26
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W. D. Adams, EW-90, ORO
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W. E. Muno, USEPA-V, 5HR-13
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D. A. Ullrich, USEPA-V, 5H-12

TECHNICAL COMPARISON OF INSTALLING A NEW EFFLUENT LINE VERSUS REHABILITATING THE EXISTING EFFLUENT LINE USING THE INSITUFORM PROCESS

INTRODUCTION

The Evaluation of Alternatives document, submitted to the United States Environmental Protection Agency (USEPA) on January 14, 1991, compared various alternatives for rehabilitating the main outfall line from Manhole 177 to the Great Miami River. A draft Work Plan detailing the actions to be taken to perform the rehabilitation of the outfall pipeline, using the Insituform process, was scheduled to be submitted to the USEPA for review and approval by February 14, 1991. In the process of writing this Work Plan a number of technical concerns arose which questioned the feasibility and cost-effectiveness of rehabilitating the existing effluent line. These concerns led to an investigation of the rehabilitation process versus the installation of a new effluent line. The following will detail the uncertainties associated with the Insituform process, illustrate the cost-effectiveness of installing a new effluent line, and propose a strategy for installing the new effluent line.

Appendix A contains an estimate for the time required to install a new effluent line starting at the existing Manhole 176, tentatively identified as the most appropriate point to divert flow to a new line, and proceeding to the Great Miami River. Appendix B contains the cost comparison between the Insituform rehabilitation process and the installation of a new effluent line.

TECHNICAL EVALUATION OF INSTALLING A NEW EFFLUENT LINE

The purpose of this section is to describe the technical comparison conducted between rehabilitating the existing outfall line versus installing a new effluent line. The format for this section will consist of first discussing the recently discovered technical concerns with the Insituform rehabilitation approach and then discussing the alternative of installing a new effluent line. The installation of a new effluent line offers a number technical benefits which will be discussed in presenting the evaluation.

INSITUFORM REHABILITATION ACTION ON EXISTING EFFLUENT LINE

There are several concerns which have surfaced since the proposed rehabilitation recommendation. The following items describe the most serious issues which were considered: 1) the problems associated with the shut-down of the effluent line, 2) the uncertainties associated with the installation of the Insituform liner, 3) the lack of a guarantee for success under the Insituform process, 4) the greater number of health and safety concerns with using the Insituform process.

The Insituform liner was proposed to be inserted into the existing effluent line on a section-by-section basis. This would correlate to a total of five sections, with at most one or two sections completed each week. Due to the length of time for the inversion process, the actual liner installation, as well as the curing and hydrostatic testing time, extensive by-pass pumping would be required. The by-pass pumping becomes even more complicated, if not impossible, during high precipitation events. An alternative to by-pass pumping may be to transport the effluent to the Great Miami River using tankers or vacuum trucks. The risks associated with by-pass pumping, in terms of contaminant releases to the environment, and the difficulties associated with transversing State Route 128 with temporary by-pass lines make the rehabilitation initiative even less attractive.

A detailed evaluation of the Insituform process, even though believed to be the best alternative for rehabilitation purposes, revealed uncertainties as to the ultimate success of the project, which was defined as the ability of the effluent line and manholes to demonstrate compliance with the ANSI AWWA (American Water Works Association) C600-87 Standard; a hydrostatic leak test. One concern was the ability of the Insituform application to seal the end points of each liner at the manholes. Grout deposits inside the manholes could potentially hamper the ability to effectively seal the pipeline. Another concern, although not directly addressed by the Insituform process, was the manholes themselves. Effectively rehabilitating the effluent line with the Insituform process would not solve the entire problem. The manholes themselves may need to be rehabilitated.

Rehabilitating the existing pipeline as proposed in the Evaluation of Alternatives document may not be sufficient to successfully recondition the line to a level which would be acceptable under the ANSI AWWA standard. Further actions may be required to achieve the desired result. The advantage of a new line is that it can be easily tested prior to receiving any effluent.

There are several health and safety concerns associated with both options. A Health and Safety Plan for either alternative would evaluate all of the relevant issues. However, there are more health and safety concerns associated with the Insituform process than are associated with the installation of a new pipeline. For instance, the installation of a new pipeline, composed of high density polyethylene, HDPE, would not require the use of any hazardous chemicals, as opposed to the Insituform process which will rely on the use of large quantities of epoxy resin to establish the integrity of the fiber mesh insert as well as for adhesion to the inside walls of the pipeline. The curing process for the Insituform liner requires relatively high temperatures, approximately 180 degrees Fahrenheit, which presents another potential health and safety concern. Also, confined space entry into the existing manholes for the rehabilitation option would require entering areas of known radiological contamination; whereas, the installation option would most likely provide a "clean" environment for the workers, thereby reducing their risk to radiation and hazardous chemicals. Sampling and analysis, however, will be conducted along the route of the proposed effluent line to confirm that no hazardous or radiological contaminants are present, prior to construction start-up.

INSTALLATION OF A NEW EFFLUENT LINE

The overriding justification for installing an up-graded effluent line is that calculations have shown that under the anticipated future flow conditions the existing 16" diameter pipeline will not support the full range of effluent discharge requirements. Flow rates for the Operable Unit #5 Remedial Action Project have been estimated at between 2,000 and 5,000 gallons per minute, which does not include the existing effluent discharge requirements. A total future flow rate has been estimated at 8,000 gallons per minute.

The primary concern with the installation of an up-graded effluent line is the extra time which may be required, as opposed to the rehabilitation process, to have a fully tested and operational outfall line. The construction phase for installing a new pipeline is longer than the previously proposed Insituform rehabilitation. Additional time may be required to gain the appropriate property right-of-ways which may be needed as well as to gain applicable construction permits with the State of Ohio and the Army Corp of Engineers. Additional time will be required to complete the design phase for the new line. A new effluent line will, however, offer a guarantee of success that would not be available with the Insituform rehabilitation option. The diameter of the new effluent pipeline will be designed to handle all future flow requirements. Furthermore, an additional margin of safety will be built into the design to handle any potential unknowns.

The existing line will be capped and left in place for final remediation. The manholes will be secured to prevent entry. The proposed soil and groundwater characterization, which is detailed in the proposed RI/FS Work Plan Addendum, will analyze the Manhole 179/180 region for potential contaminants which may have been released from the effluent line under past and present operations.

A new, up-graded effluent line will offer a number of other advantages in addition to the ones mentioned above. For instance, the new line will offer a much greater flow capacity than the existing 16" diameter pipeline. The coefficient of friction, or "C" factor, will be enhanced which will also result in higher flow rates. Also, radiological or chemical contaminants will not be absorbed onto the inside surface of a high density polyethylene (HDPE) pipe as has been observed with the present cast-iron pipe.

COST COMPARISON OF REHABILITATION VERSUS INSTALLATION OF NEW EFFLUENT LINE

Appendix B contains the cost comparison between the proposed alternative of rehabilitating the outfall line from Manhole 177 to the Great Miami River with the Insituform process versus installing a new effluent line from Manhole 176 and extending it to the Great Miami River. In order to determine a rough order of magnitude cost estimate for the two options, a number of assumptions were made. The major assumptions for each option are identified in Table 1 below. As can be seen from the first subtotal, the relative costs for materials and installation are roughly the same for either option.

TABLE 1: ASSUMPTIONS UTILIZED FOR ESTIMATING COSTS ASSOCIATED WITH BOTH OPTIONS

INSITUFORM REHABILITATION	NEW EFFLUENT LINE
1. A 16" Insituform Liner.	1. A 24" HDPE line.
2. Rehabilitation of Outfall at the Great Miami River.	2. Install new Manholes.
3. Install a new Sampling Manhole.	3. Construction of Outfall at the Great Miami River.
4. Provide for by-pass allowance and hydrostatic testing of manholes and effluent line.	4. Provide for 25 percent contingency.
5. Provide for 20 percent contingency.	

INCORPORATION OF THE NEW EFFLUENT LINE INTO OPERABLE UNIT #5 UNDER THE SOUTH PLUME REMOVAL ACTION

In order to accomplish the desired objective of having a fully functioning effluent line, the DOE recommends including the installation of the new effluent line under the South Groundwater Contamination Plume Removal Action of Operable Unit #5. Currently, the South Groundwater Contamination Plume Removal Action Work Plan is being developed. Therefore, the most cost effective and timely mechanism in which to achieve the design and installation of a new effluent line, in order to support the South Plume pumping and discharge requirements, would be to incorporate this work into the South Plume project. A draft South Groundwater Contamination Plume Removal Action Work Plan including this work will be submitted for the USEPA to review and approve. This plan will also detail the installation of this new effluent line.

Specifically, it is proposed to terminate the proposed action associated with the Rehabilitation of the Main Outfall Line Removal Action. The design and construction of a new line will be accomplished through a change in Work Scope to an existing project and using available funding as identified in Activity Data Sheet 6B2.

SCHEDULE AND TIME FRAME FOR INSTALLING A NEW EFFLUENT LINE

Appendix A contains a rough schedule outlining the course of events and time required to install a new effluent line. The time frame is based on amending the South Groundwater Contamination Plume Removal Action Work Plan, developing and approving an ECP for the change in work scope, acquiring the applicable easements and right-of-ways, completing the design work, and construction activities. This schedule shows completion for April 1992, even so, efforts will be made for a December 1991 completion.

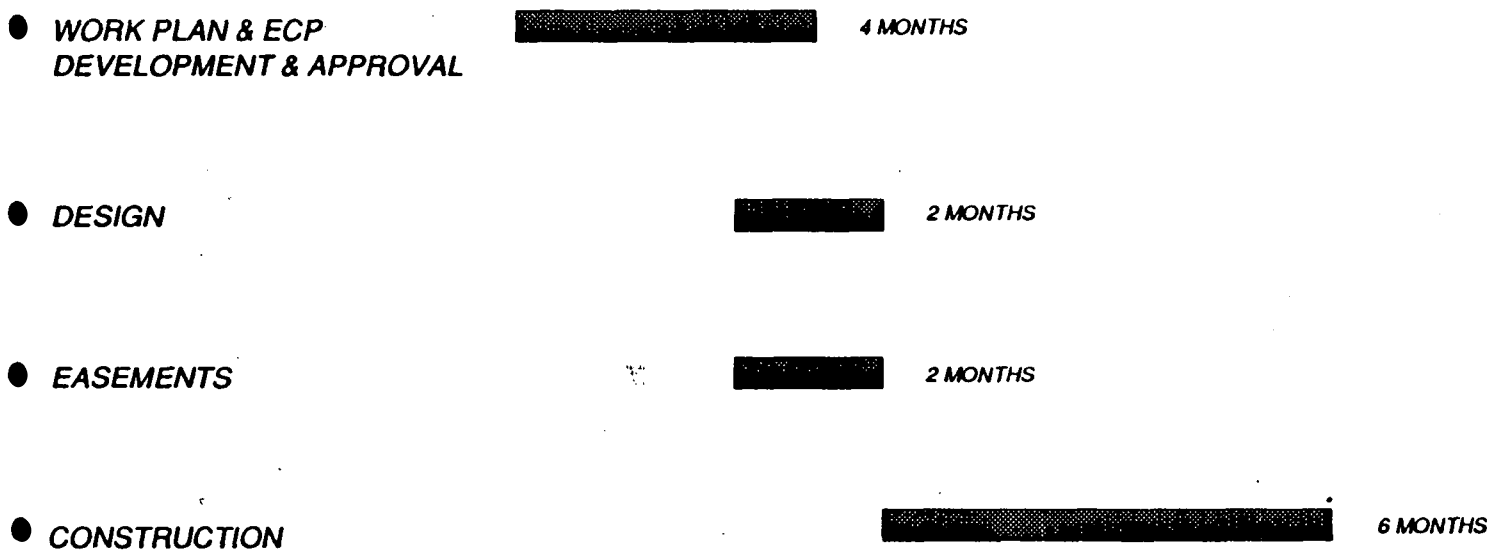
RECOMMENDATION

Based on the uncertainties associated with the rehabilitation process as proposed in the Evaluation of Alternatives document and the rough cost estimate provided here, the DOE recommends that a new effluent line be designed and constructed.

APPENDIX A

SCHEDULE FOR THE INSTALLATION OF A NEW EFFLUENT LINE

Installation of New Effluent Line



*PROPOSED CONSTRUCTION COMPLETION DATE - APRIL '92

[redacted]

APPENDIX B

COST ESTIMATES COMPARING THE INSITUFORM REHABILITATION ALTERNATIVE WITH THE INSTALLATION OF A NEW EFFLUENT LINE

[redacted]

[redacted]

ESTIMATE SUMMARY

FMPC
Engineering Division

Project Number: NA
File Number: 1020-IS
Client & Dept: CERCLA - OU #3

Sheet: 1 of 1
Date: 02/15/91
Estd. by: BW HAMBLEN
Chkd. by: RKR

PROJECT TITLE: OUTFALL PIPE UPGRADE
Location: Sewage Treatment Plant

CODE	ITEM DESCRIPTION	MAT'L $	LABOR $	SUBCONTR	TOTAL $
	"Insituform" Lined existing 16" Dia. Pipe.	760,000	0	0	760,000
					0
	Place/Remove Cofferdam and Outfall Materials.	0	0	125,000	125,000
					0
	Existing Manhole (5 ea) Repair.	0	0	37,500	37,500
	Place New Sampling Manhole.	0	0	8,000	8,000
	"By-Pass" Water Moving Allowance.	0	0	80,000	80,000
	Test Existing Manholes.	0	0	20,000	20,000
					0
					0
					0
					0
SUBTOTAL		760,000	0	270,500	1,030,500
JOB CONDITION FACTORS	21.0%				216,400
INDIRECTS	19.0%				195,800
HEALTH PHYSICS	30.0%				309,200
SUBTOTAL					1,751,900
CERCLA	1.2%				21,000
BOND	3.0%				52,600
GEN CONTRACTOR MARK-UP	5.0%				13,500
SUBCONTRACTOR OH&P	25.0%				438,000
SUBTOTAL					2,277,000
RUST CM OH&P	24.0%				546,500
SUBTOTAL					2,823,500
FSAR (SAFETY RPT)	Note: Engineering Costs per Operable Unit Manager.				10,000
					0
PROJ. MGMT.-WMCO	8.0%				182,200
ENGINEERING	3.6% Title I&II	54,100	Title III	27,100	81,200
SUBTOTAL					3,096,900
SALES TAX	5.5%				41,800
DECONTAM & DISPOSAL	$600 2 bx's	1,200	Equip. Decon.	5,800	7,000
SUBTOTAL					3,145,700
ESCALATION	3.7% (FY91-2 to Mid FY91-4)				116,400
SUBTOTAL					3,262,100
CONTINGENCY	20.0%				652,400
TOTAL ESTIMATED COST					$ 3,915,000

[redacted]

ESTIMATE SUMMARY

FMPC
Engineering Division

Project Number: NA
File Number: 1020-PP
Client & Dept: CERCLA - OU #3

Sheet: 1 of 1
Date: 02/15/91
Estd. by: BW HAMBLEN
Chkd. by: RKR

PROJECT TITLE: OUTFALL PIPE UPGRADE
Location: Sewage Treatment Plant

CODE	ITEM DESCRIPTION		MAT'L $	LABOR $	SUBCONTR	TOTAL $
	Polypropylene Pipe, PRO-45, 24" Dia.		459,500	54,600	0	514,100
	Trench Exc/Bkf/Compact (New Line).		38,000	40,200	0	78,200
	Trench Shoring (New Line).		14,100	17,200	0	31,300
	Press. Manholes, Precast Conc. 5 ea.		12,000	17,500	0	29,500
	Horizontal Boring Under RT 128.		0	0	48,000	48,000
	Reg. Manholes, Precast Conc. 2 ea.		1,900	2,800	0	4,700
	Plug and Seal Old Pipe and MHs.		5,000	35,000	0	40,000
	Place/Remove Cofferdam & Outfall.		0	0	125,000	125,000
						0
Note:	Decontamination and Disposal Costs for soil are not required for this project.					
	Per Operable Unit #3 Personnel.					0
						0
SUBTOTAL			530,500	167,300	173,000	870,800
JOB CONDITION FACTORS		22.0%				191,600
INDIRECTS		14.0%				121,900
HEALTH PHYSICS		25.0%				217,700
SUBTOTAL						1,402,000
CERCLA						30,000
BOND		3.0%				42,100
GEN CONTRACTOR MARK-UP		5.0%				8,700
SUBCONTRACTOR OH&P		25.0%				350,500
SUBTOTAL						1,833,300
RUST CM OH&P		24.0%				440,000
SUBTOTAL						2,273,300
FSAR (SAFETY RPT)						10,000
						0
PROJ. MGMT.-WMCO		8.0%				146,700
ENGINEERING		10.0%	Title I&II	121,000	Title III 60,500	181,500
SUBTOTAL						2,611,500
SALES TAX		5.5%				29,200
DECONTAM & DISPOSAL		$0	0 bx's		0 Final demol. 0	0
SUBTOTAL						2,640,700
ESCALATION		3.7%	(FY91-2 to Mid FY91-4)			97,700
SUBTOTAL						2,738,400
CONTINGENCY		25.0%				684,600
TOTAL ESTIMATED COST						$ 3,423,000

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